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HISTORY AND CONSTRUCTION  
OF THE BRIDGE ACROSS PAINT BRANCH ON  
COLUMBIA PIKE IN MONTGOMERY COUNTY, MARYLAND

FOR INITIATION INTO TAU BETA PI FRATERNITY  
BETA CHAPTER OF MARYLAND  
COLLEGE PARK, MARYLAND

*April 8, 1932*

## SUMMARY

The first bridge was an old iron structure of two spans, which was built in the early part of the Nineteenth Century. Having served its purpose over a long period of years with none too good maintenance, a new and more modern bridge was erected adjacent to it in 1912 by the Luten Bridge Company of York, Pennsylvania. This bridge was of three spans each a reinforced concrete arch and at that time was the second structure of its type in this section of Maryland.

With the invention of the automobile and its rapid growth together with the laying out of many miles of paved roads encouraged to a great degree by Federal aid, traffic became so heavy that many old structures or bridges had to be widened to accommodate this increase. Among such structures was the Luten Bridge over Paint Branch.



## BIBLIOGRAPHY

The information obtained by me for this thesis was procured mostly from Mr. M. D. Knight, who was County Engineer for Montgomery County, Maryland, at the time the Luten Bridge was built in 1912.

The Records of the Minutes of the Meetings of the Montgomery County Commissioners, Maryland, also afforded me some help. These were located in the new Court House at Rockville, Maryland. As this Court House had just been occupied it was practically impossible to search any records before the year of 1879, for all these old records were strewn about the top of filing cabinets in no orderly fashion; in fact I was not allowed to search through them.

Still further I journeyed to Baltimore, Maryland, where I visited the State Roads Commission and secured plans for the widening of the Luten Structure in 1930.

I was fortunate, however, in procuring some very good photographs of the various stages of the construction work on the Luten Bridge from Mr. E. P. Owings, who was an inspector on the bridge at the time of its construction.



## EARLY HISTORY

Studying the early history of roads in Maryland, just after the formation of the Union, one's attention is immediately turned to the old Post Road from Ellicott City to Washington, D.C., over which much of the traveling of that day was done between these two points. This road also served as a means of bringing to the mill at Ellicott City the grain which was produced in this section of Maryland, and which was subsequently shipped to Washington, D.C., and other points within about a 40 mile radius in the form of flour, dairy feed and the like. But with the advent of the steam engine in later years, this old road was abandoned for a time and practically all this commerce was carried on by rail shipment.

However, with the laying out of the Columbia Pike from Westminster, Md., to Washington, D.C., a portion of the aforementioned old Post Road coincided with it and as a result travel over it was again resumed. The Columbia Pike followed the natural contour of the land for the most part which was level and in a number of places rolling terrain. The absence of hills and heavy grades in this new road attracted considerable wagon traffic just after its completion, but there was one point in the road which was the dread of all teamsters. It was the old iron bridge over Paint Branch between White Oak and Fairland. This bridge was 100 feet long, 26 feet high and was built upon one stone pier and two stone abutments, which are still standing. The approaches on both ends were downgrade and very steep. It is also of interest to note that the live load upon which this bridge was designed was five tons.



How inadequate this would be for our present day vehicles and their correspondingly heavy loads. This bridge must have needed considerable looking after in its time for contained on Page 43 of the Record of the Minutes of Montgomery County Commissioners is the following transcript:

September 2, 1879.

The County Commissioners met pursuant to a request made by Mr. Thos. G. Hardesty.

Present

David Griffith  
Thos. Henderson  
Wm. W. Poole

John Saunders  
and  
Thos. G. Hardesty.

Mr. Hardesty made a statement to the Board in regard to the condition of the bridge over Paint Branch on the Old Columbia Road, and on motion of Mr. Griffith, Mr. Hardesty was appointed to let the repairs to said bridge and abutment to the lowest bidder subject to the approval of the Board.

#### RECENT HISTORY

As time passed on the citizens of this county, more particularly the residents of the Fifth District of Montgomery County, felt the need of a stronger bridge to supplant the old iron bridge to carry the then increasing wagon loads which were coming into use.



A petition was gotten up by the residents of Montgomery County, Md., for the construction of a new bridge to replace the old and fast deteriorating iron bridge.

The following transcripts from the Records of the Minutes of the Montgomery County Commissioners are evidence of the initiative taken in this matter by the citizens together with the various stages of the preliminary work leading up to the actual award of the contract for a new bridge:

August 28, 1911.

In the matter of the proposed bridge over Paint Branch a proposition was made to the Board by E. T. Conly and others to furnish all over the sum of \$8,500, and not to exceed \$10,000, out of the amount raised by bond issue, in the event of the construction of a concrete bridge, and in the event of the construction of a steel bridge to pay to the Commissioners the interest for one year on cost of same. The Board took the matter under advisement and ordered bids advertised for both steel and concrete bridge.

September 12, 1911.

Ordered this day in compliance with Sec. 177N, Chapter 484, Acts of 1910, that Messrs. Wm. H. McCurey, E. P. Marlowe, M. D. Knight, Supt., be and they are



hereby appointed examiners to determine the amount of damages and assess the benefits caused or to be caused by the change of location of the bridge on the Columbia Road over Paint Branch.

September 19, 1911.

The following bids were received on the Paint Branch Bridge on the Columbia Road, bidders submitting their own plans.

Baltimore Bridge Co.           \$5,870.00

Concrete Abut.           \$7.75 per cubic yd.

Roanoke Bridge Co.	\$6,701.00	Complete	60 days.
Steel	6,398.00	"	90 "
Rein. Concrete	9,629.00	"	60 "

Nelson-Meredith Co. Bid #1.	\$7.175.00		
Concrete Abut.	8.75	cubic yd.	
Old bridge removed	225.00		

Nelson-Meredith Co. Bid #2.	\$9,874.00		
Concrete Abut.	8.75	cubic yd.	
		Complete	90 days.

Luten Bridge Co.	\$9,774.00	Complete	90 days.
		Remove old bridge	60 days.

York Bridge Co.	\$5,200.00		
Concrete Abut.	8.25	cubic yd.	

J. S. McIlvaim & Co.           \$5,680.00

The Board deferred action on above bids.



September 26, 1911.

The report of Examiners on Paint Branch Bridge was adopted.

Ordered this day that all bids received on the Paint Branch Bridge be and the same are hereby rejected.

Ordered this day that plans be prepared and bids on same be advertised for on the Paint Branch Bridge.

April 23, 1912.

The contract to erect a concrete bridge over the Paint Branch on the Columbia Road was awarded to the Luten Bridge Company of York, Pa., at and for the sum of \$9,000.00, the sum of \$6,000.00 to be paid to the contractor on estimate furnished by road Superintendent and the remaining three thousand to be paid to the contractor on August 1, 1913, after completion of contract.

The bid of \$9,000.00 by the Luten Bridge Company was considerably under other bids according to Mr. Knight for there is no record of the final bids and award, but when it was considered that this bridge company presented its own plans and specifications and design, using a reinforced concrete arch instead of a solid masonry or concrete arch as other bidders had done, one can



readily see the saving in material afforded by this new design. It was the second reinforced arch <sup>ure</sup> struction of that day in Maryland, only one other being previously constructed and that was located over Sligo Branch, and which today stands out as an engineering feat, both as to its strength and beauty.

#### Construction of New Bridge

The new structure, that is the Luten Bridge, was built in the year of 1912, and was located upstream about 50 feet, the abutments of which rest on solid rock cliffs on both sides of the branch and the piers too being built upon rock in the stream bed.

At the time this new location for the bridge was laid out, the then County Engineer, Mr. M. D. Knight, advised the County Commissioners to locate the bridge at least 1,000 feet downstream where natural approaches to the bridge could be had by following the contour of the land, with the result that no grades would be encountered upon entering the bridge. But there too, the old story of additional cost to the County again presented itself and as a result the bridge was located on its present site as originally planned, for it was indeed a problem to raise money in those days for such improvements. Then too there were two bad turns on the approaches to the new structure due to the bridge having been built 50 feet away from the old structure with no provision made for the changing of the roadway approaches to the bridge. In other words, the Columbia Pike was in no way altered but turnouts to meet the new structure were made. Even though the Luten bridge



was raised 15 feet above the old iron bridge there still remained an 8% grade on both approaches.

When the Luton Bridge Company was awarded the contract, permission was granted to use the local sand and gravel, which was not of the best, particularly the sand which contained some clay. The cement used was purchased from Germany at a price of \$8.00 per barrel, which was hydraulic cement. Permission to use the local sand and gravel was received only after the Luton Bridge Company had convinced the County that they had taken the contract at such an inviting figure and being \$3,000.00 below the estimated cost, the Commissioners permitted them to use this local material.

After the completion of the structure and before the Luton Bridge Company could get its final payment of 10% as held back by contract as a retainer, they were required to post a bond in the amount of \$5,000.00 for five years to guarantee the bridge against any defects. The only defect of the bridge was caused by the laitence in the concrete. This was due to the fact that the concrete was poured into the forms from a high point and all the coarse aggregate settled to the bottom while the fine particles from the cement and much of the dust and dirt from the aggregates together with the foam on the surface of the water formed a milky appearing substance. When the bridge was widened these defective portions of the piers had to be chiselled off and an 18" encasement of new concrete was constructed around them using dowels and tie-rods.



It is very interesting to note the manner in which the spans were tested after completion. Two 5-ton rollers were run across the spans side by side. Before they entered the spans, however, a rod reading was taken at the center and just as the two machines rolled by the center another rod reading was made in order to measure the deflection. Mr. Knight stated that the deflection thus made was negligible. The two rollers were equivalent to the 10-ton load under which the bridge was designed and also were equivalent to the heaviest tractor engines used about the farms.

#### Description of Bridge

The bridge has a length of 200 feet. Its roadway is 16 feet wide. The length of span is 60 feet. The height of the piers are 28 feet and 31 feet. The height of the crowns of the arches above the spring lines is 9 feet 4 inches at the piers while the springs at the two abutments are 5 feet <sup>below</sup> above the springs at the piers. The center span is a six centered arch while the two end spans are five centered arches. The width of the piers at the base was 6 feet 8 inches. Its width is 17 feet 4 inches while the clear roadway is 16 feet. The overall length is 200 feet including the abutments.

#### Widening of Bridge

In 1930 the bridge was widened to take care of the ever increasing traffic over the pike. The width added was 12-1/2 feet, thus increasing the clear roadway to 27 feet. As stated before an



18 inch encasement of concrete was added on the old piers while the new ones were constructed with the original width of the Luten Bridge. The wings and railing on the downstream side were removed down to a point to permit the laying of the roadway. The pier foundation rested upon solid rock. A macadam surface was supplied to supplant the old dirt surface. For further details see accompanying plans.

The total cost of the widening amounted to \$16,000. This is a large sum compared to the original cost of construction of \$9,000 for the Luten Structure. But considering the great increase in cost of labor and material from 1912 to 1930, one can readily comprehend the reason for this estimate.

#### Conclusion

Mr. Knight endeavored to have the County Commissioners have the State Roads Commission take over a portion of the Columbia Pike as a State Road and widen it to relieve traffic on the Baltimore-Washington Boulevard and make it an outlet for traffic from Laurel into Washington via 16th Street and Georgia Avenue. But no heed was taken of his suggestion at that time which was about the time of our entry into the World War. Today this road stands out as an evidence of Mr. Knight's foresight in the matter for it is serving the purpose for which he calculated it would in the near future at that time. Also the County Commissioners remarked that there was a paved road by way of Ashton which would well serve the purpose for which Mr. Knight foresaw the Columbia Pike would in time serve.



Today the layman looks upon our present construction methods as some asset that has been handed down to us through the ages, but when one stops to think that at the time the Luten Bridge was built over Paint Branch in 1912, reinforced concrete was in its infancy. What strides have been made since then! At that time hydraulic cement had to be imported from Germany at a cost of \$8.00 per barrel for reinforced concrete work while in other structures of that day where concrete was used without reinforcement, natural cement was used which had a lower compressive strength as compared with hydraulic cement. Then too we have witnessed in our time the establishment of plants in our country for the manufacture of hydraulic cement, better known to us as Portland, and at a cost of considerably less than \$8.00 per barrel. Still further we have by careful testing and analytical work increased the allowable stresses in the concrete and steel, and have effected even smaller cross-sectional areas of beams and slabs to carry the loads that larger sections carried in 1912. One is therefore impressed with what a great field is open to the engineer both in experimental and construction work in the field, and what further knowledge of these materials the future holds for us only time will tell.



Scale  
1" = 50 ft













